QUALITY CONTROL REPORTS FOR

GRANUALAR SUB BASE (GSB)

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.14/KRIDL/GSB-1/GR/2014-15 Date : 03.07.2014

GRADATION FOR GSB-I (CLOSE GRADED)
IS: 2720 (Part 4).

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of work : Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014

Date of Testing : 03.07.2014

Sample Source : GSB Mix Plant Bangalore. **Oven Dry Wt (gm) :** 25300

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Specified Limits
75.0	0	0	0.00	0	100
53.0	1185	1185	4.68	95.32	80-100
26.50	6260	7445	29.43	70.57	55-90
9.50	3870	11315	44.72	55.28	35-65
4.75	3585	14900	58.89	41.11	25-55
2.36	2025	16925	66.90	33.10	20-40
0.425	4690	21615	85.43	14.57	10-25
0.075	2585	24200	95.65	4.35	3-10
PAN	1100				
Total	25300				

Remarks: Satisfies MORTH Specifications as per Table 400-1, Grading I

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ಟಿ. ದಾಸರಹಳ್ಳಿ ಉಪ-ವಿಭಾಗ
ಬಾಗಲಗುಂಟೆ, ಬಿಬಿಎಂಪಿ
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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.14/KRIDL/GSB-1/AL/2014-15 Date : 03.07.2014

ATTERBERG LIMITS TEST FOR GSB (CLOSE GRADED)
IS : 2720 (Part - 5)

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of work : Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014

Date of Testing : 03.07.2014

As per MORTH Table : 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	22.00	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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QUALITY CONTROL REPORTS FOR

WE MIX MACADAM(WMM)

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/Gradation/2014-15 10.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014

Date of Testing : 10.07.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **25900**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	995	995	3.8	96.2	95-100
22.4	5485	6480	25.0	75.0	60-80
11.2	5240	11720	45.3	54.7	40-60
4.75	4985	16705	64.5	35.5	25-40
2.36	3625	20330	78.5	21.5	15-30
0.600	2215	22545	87.0	13.0	8-22
0.075	2205	24750	95.6	4.4	0-8

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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/AIV/2014-15 10.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	10.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.42	22.62	
	$100^* (W_2/W_1)\%$			22.24

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/S-T/2014-15 10.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	10.07.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.12%**

Elongation Index = **13.95%**

Result : Combined Flakiness & Elongation index 26.07%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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QUALITY CONTROL REPORTS FOR

SEMI DENSE BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.14/KRIDL/QB(SDBC)/2014-15 19.07.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	:	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
REFERENCE	:	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	19.07.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	296	Min. 220

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/AIV/2014-15 19.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	375	376	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	75	76	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	300	
4	Aggregate Impact value = percent fines	20.00	20.21	
	100* (W_2/W_1)%			20.55

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/AIV/2014-15 19.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	300	
4	Aggregate Impact value = percent fines	20.63	21.05	
	100* (W_2/W_1)%			21.04

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
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Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	300	
4	Aggregate Impact value = percent fines	22.08	22.28	
	100* (W_2/W_1)%			**21.94**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 : 19.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 19.07.2014

Result : Flakiness Index = **11.23%**

Elongation Index = **13.32%**

Result : Combined Flakiness & Elongation index **24.55%**

Comments:

Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 : 19.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 19.07.2014

Result : Flakiness Index = **12.28%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index **25.38%**

Comments:

Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 : 19.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 19.07.2014

Result : Flakiness Index = **12.35%**

Elongation Index = **13.65%**

Result : Combined Flakiness & Elongation index **26.00%**

Comments:

Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Stripping/2014-15 22.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.07.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.40	96.60
2	3.4		
3	3.5		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

Note:

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Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	PRe-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	22.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2023	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1268	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2016	2017	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	748	748	748	
6	Weight of oven dried aggregate	W_4 g	1999	2000	2001	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.672	2.674	2.675	2.674
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.731	2.732	2.734	2.732
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.80%	0.80%	0.80%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0

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BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Roads in Soundarya Layout Ward No.14.
DATE OF TESTING	22.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.50
7. Bitumen content in %	5.00	5.10
8. Average	**5.05**	

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BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Roads in Soundarya Layout Ward No.14.
DATE OF TESTING	22.07.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.35	5.34	5.34	94.66	90-100
4.75	262.3	55.22	60.56	39.44	35-51
2.36	52.32	11.01	71.57	28.43	24-39
1.18	38.23	8.05	79.62	20.38	15-30
0.3	33.21	6.99	86.61	13.39	9-19
0.075	39.32	8.28	94.89	5.11	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.25	7.64	7.64	92.36	90-100
4.75	263.3	55.49	63.13	36.87	35-51
2.36	36.25	7.64	70.77	29.23	24-39
1.18	37.52	7.91	78.68	21.32	15-30
0.3	38.56	8.13	86.80	13.20	9-19
0.075	33.21	7.00	93.80	6.20	3-8

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Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Re-Asphalting Main Road and cross Roads at Soundarya Layout & Meenakshi Layout in Ward No.14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 30.06.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	22.07.2014

Total Weight of Sample: **5450** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	430	7.9	7.89	92.11	90-100	
4.75	2675	49.1	56.97	43.03	35-51	
2.36	685	12.6	69.54	30.46	24-39	
1.18	480	8.8	78.35	21.65	15-30	
0.3	435	8.0	86.33	13.67	9-19	
0.075	400	7.3	93.67	6.33	3-8	

Total Weight of Sample: **5300** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	265	5.0	5.00	95.00	90-100	
4.75	2570	48.5	53.49	46.51	35-51	
2.36	820	15.5	68.96	31.04	24-39	
1.18	525	9.9	78.87	21.13	15-30	
0.3	430	8.1	86.98	13.02	9-19	
0.075	410	7.7	94.72	5.28	3-8	

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